

Himalayas, a Temminck's Tragopan (*Cerionis temmincki*) from China, a Spotted Turtle Dove (*Turtur suratensis*) from India, presented by H.R.II. the Prince of Wales, K.G.; two Black Lemurs (*Lemur macaco*) from Madagascar, presented by the Rev. G. P. Badger, D.C.L., F.Z.S.; a Sykes's Monkey (*Cercoptes albugularis*) from East Africa, presented by Miss Mabel Beale; a Sambur Deer (*Cervus aristotelis*) from Malacca, presented by Mr. W. H. Stevenson; a Stanley Crane (*Tetrapteryx paradisæ*) from South Africa, presented by Capt. Edward Jones, R.M.S.S. *Conway Castle*; a Wood Owl (*Syrnium aluco*), European, presented by Mr. W. Addison; a Kittiwake Gull (*Rissa tetradactyla*), European, presented by Mr. H. R. Bower; a Hairy-nosed Wombat (*Phascolumys latifrons*) from South Australia, deposited.

OUR ASTRONOMICAL COLUMN

THE HARVARD COLLEGE OBSERVATORY.—We have received the Thirty-fourth Annual Report of the Director of this Observatory, presented to the Visiting Committee on December 5. Prof. Pickering notifies that the subscription of 5,000 dollars a year for five years, suggested in his previous Report, for relieving the immediate needs of the Observatory, more especially with regard to the publication of accumulated work, has been completed through the liberality of some seventy ladies and gentlemen, who have thus shown their interest in the establishment, an example of scientific zeal, we may say, by no means unique in the United States, nor indeed in the history of the Harvard Observatory; it may be remembered that the beautiful plates illustrating Mr. G. P. Bond's great work upon Donati's comet (Harvard *Annals*, vol. iii.) were contributed by a few citizens of Boston and vicinity. The success attending the subscription has enabled both the equatorial and the meridian circle to be actively used during the year, the former frequently through the night. Photometry is still made the prominent feature in the work; vol. xi. of the *Annals* will contain the results of over 25,000 photometric observations, principally made with the large equatorial; amongst them are measurements of the outer satellite of Saturn, *Japetus*, on 101 nights in the autumn and winter of 1878-79, which, with similar observations on twenty-eight nights in the previous year, will furnish a determination of the law followed by this satellite in its changes of brightness. Another work of some extent, in the same direction, was commenced in 1879, viz., a determination of the light of all stars visible in the latitude of Harvard College; a preliminary catalogue has been formed containing all the stars in the Uranometries of Argelander and Heis, and in Behrmann's Atlas, with the stars of the *Durchmusterung* to the sixth magnitude inclusive. Most of the stars being inconspicuous objects, Prof. Pickering remarks, there would be much loss of time in identifying them in the field of a photometer mounted on an ordinary stand. This he avoids by observing them in the meridian as with a transit-instrument. "The photometer consists of a horizontal telescope pointing to the west, and having two objectives. By means of two prisms mounted in front of the telescope the pole-star is reflected into one object-glass, and the star to be measured into the other. The cones of light are made to coincide by a double-image prism, the extra images being cut off by an eye-stop. The star to be measured is thus seen in the same field with the pole star, with the same aperture and magnifying power." Errors to be apprehended in the use of the Zöllner photometer and other instruments, when the comparison is made with an artificial star are by this means eliminated. Of the work with the meridian circle, the observation of eight thousand stars in the zone +50° to +55° undertaken by the Observatory, and which has occupied Prof. Rogers during the greater part of eight years, was completed on January 26, 1879, and is mentioned as one of the largest astronomical undertakings which have been carried to completion in the United States; some years, it is added, will still be required to finish the reductions and publication of this work. The General Catalogue, 1874-75 (in vol. xii.) will be issued shortly, over two hundred pages being in type. Vol. xi., to which we have alluded, will be distributed in the course of the present year.

It will be seen from this summary of the contents of Prof. Pickering's Report that the Harvard College Observatory is fully maintaining the high reputation it acquired under the management of his predecessors, and the discrimination with which the

subjects to which attention is directed are chosen, so as to avoid unnecessary or useless duplication of work, is not the least important point to be remarked. If this should hardly appear to apply to the proposed determination of the light of naked-eye stars, it must be remembered that the previous determinations of Argelander, Heis, &c., were made from eye-estimation, not by photometric instruments.

THE MINOR PLANETS IN 1880.—The specialty of the *Berliner astronomisches Jahrbuch* is well known to be the ephemerides of the small planets, which at the expense of a great amount of labour Prof. Tietjen has for many years kept up so nearly to our knowledge of these bodies. In anticipation of the appearance of the volume for 1882, these ephemerides applying to the year 1880 have just been circulated amongst observers. In addition to fifty-nine accurately computed ephemerides about the times of opposition of as many planets, there are approximate places for every twentieth day of the first one hundred and ninety-nine of this numerous group, excepting only *Dike* and *Scylla*, for which adequate material for calculation does not exist. Only two out of the number approach the earth during the year, within the distance 1°0, viz., *Ariadne*, in the middle of May, distance 0°923, and *Progne*, in the middle of August, distance 0°996.

That *Dike*, No. 99, should be still adrift, notwithstanding it was discovered as far back as May, 1868, is not perhaps a matter for surprise, considering that M. Borrelly, when he detected it, did not estimate its magnitude over 13'14, though it was within ten degrees from the perihelion. *Scylla* was observed for a fortnight in November, 1875, and may have been in opposition during the last autumn, though not found: from the elements in the *Annuaire* for 1879, it would not appear to be identical with No. 206, discovered by Prof. Peters at Clinton, N.Y., on October 13, 1879, and only observed for three or four days.

A GREAT COMET.—Dr. Gould, in charge of the Argentine National Observatory at Cordoba, telegraphs thus from Buenos Ayres to Prof. Peters, the editor of the *Astronomische Nachrichten*:—"Great comet passing sun northwards;" the telegram was received at Kiel on the 5th inst. The ocean cables may in future prevent such a surprise as was experienced in these latitudes on the sudden appearance of the huge comet of June, 1861, which, rising rapidly in declination and passing the sun, as Dr. Gould describes the new one, was observed simultaneously or nearly so, throughout Europe, with a tail upwards of 100° in length. The astronomical phenomena of the present year which admit of prediction, do not offer any feature of special interest, and a large comet will therefore come the more opportunely.

PHYSICAL NOTES

Two researches on singing condensers, such as that employed in Varley's telephone, have lately been published. M. R. Chavannes, in the first of these, maintains that undulatory currents produce no sounds in such condensers; that intermittent currents are absolutely necessary. M. Tréve has shown, in the second, that a pressure exerted upon the leaves of the condenser sufficient to drive out the air from between them will destroy the production of the tones; and that if the condenser is placed in an exhausted chamber it ceases to emit sounds.

It will be remembered that in 1876 Prof. Rowland discovered the magnetic effects of electric convection. M. Lippmann has discussed, in a recent number of the *Comptes Rendus*, the converse case of the ponderomotive force exercised upon material bodies charged with electricity by the relative motion of a magnet.

CAST-IRON MAGNETS are now being made of a superior quality by M. Carré, who publishes in the *Revue Industrielle* an account of his process. A soft and very slightly carburized metal is melted in earthen crucibles. Just previous to running into the moulds 10 to 15 per cent. of steel filings are added. In order to produce a metal which will stand tempering at a cherry-red heat, there is added either 1 to 1.5 per cent. of nickel, with 0.25 per cent. of copper, or 2.0 per cent. of tin and 0.5 per cent. of copper.

AN "acoustico-electrical kaleidoscope," the invention of M. Michelangiolo Monti, is mentioned in *Les Mondes*. It consists of a microphone used in conjunction with an induction-coil and a Geissler tube, and is, like Edmunds's phonoscope, which it

resembles, intended for the optical study of sounds. A complete description of the instrument is not, however, given.

ACCORDING to Herr H. Schwarz, an admirable cement for glass, and one which completely resists the solvent action of water, may be prepared by the following process: From 5 to 10 parts of pure, dry gelatin are dissolved in 100 parts of water. To the solution about 10 per cent. of a concentrated solution of bichromate of potash is added, and the liquid is kept in the dark. When articles joined by means of this cement are exposed to the light the gelatine film is acted upon by the chemical rays, the chromate being partially reduced, and the film of cement becomes extremely tough and durable.

THE "meter" devised by Edison for his system of domestic electric lighting depends upon the electro-deposition of copper upon an electrode in a branch circuit whose resistance bears a known ratio to that of the circuit of the user, the movable copper electrode being weighed at stated intervals in order to gauge the consumption. There is also in the "meter" a most ingenious contrivance whereby if any consumer draw too largely on the supply the armature of an electromagnet in the circuit is attracted and "cuts out" the transgressing consumer, actually fusing up the only remaining metallic connection!

LIPPMANN'S principle that if by mechanical means we deform a mercury surface, an electrical liberation is produced which tends to arrest the movement of the mercury, has led M. Debrun to contrive an apparatus (*Four. de Phys.*, January) in which mercury is admitted in drops, with acidulated water between, down a conical tube, into a vessel arranged as a Florentine receiver (giving separate outflow to the two liquids). The upper and lower masses of mercury are connected with platinum wires, which take their polarity, and a current is found to proceed in the direction of the globules. With a tube 0.30 m. long, 2.5 mm. diameter at top, and 1 mm. at the lower part, and containing at least twenty mercury globules, and not more than thirty-five, the electromotive force is about 1.4 volts, giving decomposition of water with Wollaston points. Only 2 kg. of mercury are expended in the hour. Letting the mercury flow twenty-four hours, M. Debrun was able to silver strongly a five-centimes piece. Several experiments may be made with the apparatus; thus, if the poles are disconnected the mercury flows slowly and difficultly, but when they are connected it flows very rapidly.

A NEW galvanic battery with circulating liquid, described by Signor Ponci in *Natura* (3, p. 402, 1879), has the following form:—Rectangular lead channels, beak-shaped at one end, are so placed over one another in slanting position that the beak of the first is over the broad end of the second, and so on. In each channel is an amalgamated zinc plate, and above this a carbon plate insulated from it by two rings of caoutchouc; the carbon plate is perforated under the beak of the lead channel above. The lead channels have wires, and the carbon plates, at their upper ends, binding screws, with which they are alternately connected. By means of a caoutchouc siphon a solution of chromate of potash is conducted through the system (200 gr. $K_2Cr_2O_7$, 21 water, 11 commercial muriatic acid; for long use 3 to 6 litres water and 100 to 150 ccm. muriatic acid may be added to each litre of the solution). A battery of 99 such elements gives a light-arc equal to that of a battery of 60 Bunsens, and is constant in duration.

THE following reaction, proposed by M. Jorissen, for discovering very weak traces of morphine, is reported by M. Donny (*Bulletin of Belgian Academy*) to be very sensitive. The morphine is treated first with sulphuric acid, then with ferrous sulphate; a nearly colourless liquid is thus obtained, but on letting it fall drop by drop into concentrated ammonia, a very intense blue-purple coloration is immediately produced.

GEOGRAPHICAL NOTES

AT the meeting of the Geographical Society on Monday evening, the Earl of Northbrook announced, amidst great applause, that Colonel Gordon had been elected an Honorary Corresponding Member, and at the same time passed a high eulogium on his character and his services in Egypt and elsewhere. Major-Gen. Sir M. A. S. Biddulph, K.C.B., who commanded a column in the last Afghan campaign, afterwards read a paper on the eastern border of Pishin and the basin of the Loras. The country dealt with had never previously been

examined by Europeans, all our information having been derived from native sources, and consequently the particulars so laboriously collected by Sir M. Biddulph, with the aid of the survey officers acting under him, will prove of the utmost value to cartographers. He mentioned several instances in which our present maps are entirely wrong, specifying one in which the position of a place would have to be shifted fifty miles. A peculiar characteristic of the country examined was the existence of long plains in the valleys, which rendered movement comparatively easy, another being the great number of water-partings. The basin of the Loras,—a name given to all streams in that region,—consists, in fact, of a curiously involved system of mountain ridges, about which Sir M. Biddulph furnished much valuable topographical information.

AT a committee meeting of the German African Society at Berlin, at which Dr. Gerhard Rohlfs was present, it was resolved to recommend Dr. Stecker to continue the expedition to Wadai, by way of Mursuk, Bornu, and Adamauk, as on this route he will travel under the protection of the Khedive of Egypt. According to the opinion of Dr. Rohlfs it is beyond all doubt that the Turkish government will fully compensate the Society for the loss sustained through the attack upon the expedition.

THE *Vega* left Port Said on the 6th inst., and may be expected to reach Naples to-day.

THE new number of the *Annales de l'Extrême Orient* contains, among other matter, a paper on the languages and literature of Java, by Prof. P. J. Veth, President of the Dutch Geographical Society, notes on recent Dutch explorations in New Guinea, and some remarks on Lieut. Delaporte's work, entitled "Voyage au Cambodge."

MR. ALEXANDER FORREST contributes to the December number of the *Victorian Review*, published at Melbourne, a very interesting, though somewhat brief account of his explorations during his recent journey from Perth, West Australia, to Port Darwin, in the Northern Territory. We believe that Mr. Forrest is very sanguine that large tracts of the fertile country which he has discovered will shortly be taken up and occupied by settlers.

THE last number of the *Proceedings* of the Asiatic Society of Bengal contains a paper on the exploration of the Great Sanpo River of Tibet, by Major-General J. T. Walker, which is illustrated by a map. Capt. W. E. Gowan also furnishes a translation from the Russian of the geographical information regarding the Kirghiz Steppes and country of Turkistan, afforded by the Book of the Great Survey.

WRITING to *Les Missions Catholiques* from Landana, in Congo, Père Carrie supplies a few particulars respecting Mr. H. M. Stanley's expedition from the west coast, about which the International African Association has been remarkably silent. Mr. Stanley, it appears, has with him fourteen white men, one Arab, two natives of Sierra Leone, and sixty-one men from Zanzibar, whence a large additional number are shortly expected to arrive in charge of a European. Père Carrie adds that Mr. Stanley has already established a station at Noki, some miles above Mboma. He has with him a number of wooden houses all ready for erection at various points as he advances into the interior.

AS the result of fifteen years' research into the archaeological riches of Hainault, M. Théodore Bernier has just published (*Mons: H. Maneraux*) a volume entitled "Dictionnaire Géographique, Historique, Archéologique, Biographique, et Bibliographique du Hainault."

IN connection with Mr. G. J. Morrison's paper on the Grand Canal, read before the Geographical Society on January 12, much interest attaches to a letter in the *North China Herald*, from its Tientsin correspondent, whose experiences are about eighteen months later. Being desirous of going to Tê-chow, in Shantung, he made the journey by the Grand Canal. The water in the Pei-ho at the time was higher than it had been for nearly ten years, but the Canal had risen but slightly, the water coming mainly from the streams to the south-west. On the second day, however, a sudden rise was apparent, the water wanting but an inch or two of overflowing. Still little effort was made to guard against danger; a few weeds or *kao-liang* (millet) stalks covered with earth, or simply a few shovels-full of earth in many cases, were the only defence against the rising water. To the west of the Canal was a vast expanse of flooded country, stretching for 100 miles or more. At one place where the bank was weak,